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Feature Articles
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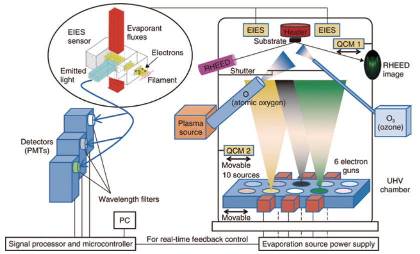
Feature Articles
Creating Novel Functional Materials

Overview of Novel Materials Creation Research at NTT

▼Abstract

The activities of NTT Basic Research Laboratories include creating novel materials with fascinating functions through materials design and arrangement control of atoms, molecules, and crystals in materials. The purpose is to make progress in materials science and eventually contribute to the development of information and communication technology. While our research covers a vast range of materials, we introduce some of the latest research accomplishments in inorganic materials, for example, oxides and nitrides, in the Feature Articles in this issue. In particular, we highlight thin films (less than a micrometer thick), atomic layer materials (less than a nanometer thick), and nanowires.



Regular Articles

High Power and High Efficiency Operation of Semiconductor Optical Amplifier Assisted Extended Reach Electroabsorption Modulated DFB Laser (AXEL) for Extension of Transmission Distance

▼Abstract

We have designed a semiconductor optical amplifier integrated with an electroabsorption modulator integrated distributed feedback laser (EML). We call this device AXEL; it is designed to enhance the power conversion efficiency and modulated light output power of EMLs. In this study, we investigated AXELs for both the L-band and O-band wavelength ranges. The results of experiments indicated that dramatically increased power conversion efficiency and modulated light output power were obtained with the fabricated AXELs. For the L-band wavelength range AXEL, a high modulated light output power of 9 dBm and an extension of 10-Gbit/s transmission distance to 80 km due to low chirp characteristics of the AXEL were simultaneously demonstrated. In addition, the 25-Gbit/s 80-km transmission achieved using the O-band wavelength range AXEL along with an avalanche photodiode was demonstrated for the first time thanks to the significantly increased modulated light output power of the AXEL.